



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,174	03/19/2004	Toshiaki Okuno	50212-581	6746
20277	7590	12/12/2005	EXAMINER	
MCDERMOTT WILL & EMERY LLP 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096			LEE, JOHN D	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

40

Office Action Summary	Application No.	Applicant(s)	
	10/804,174	OKUNO ET AL.	
	Examiner	Art Unit	
	John D. Lee	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-8,10-13,15-18,20-23 and 27 is/are rejected.
- 7) ☒ Claim(s) 4,9,14,19 and 24-26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1204</u> . | 6) <input type="checkbox"/> Other: ____. |

It is noted that applicant has intentionally not claimed foreign priority under 35 U.S.C. § 119, even though the present application is based upon Japanese Patent Application P2003-270169, filed in Japan on July 1, 2003. Domestic priority based upon two (2) earlier filed U.S. Provisional Applications is, however, claimed.

The disclosure is objected to because of the following minor informality: in line 6 on page 1, "Serial No. 60/493,348" should be inserted after "Provisional Application". Appropriate correction is required. Applicant's cooperation is requested in correcting any other errors of which applicant may become aware in the specification.

Claim 27 is objected to because of the following minor informality: in line 1 of this claim, the word "claims" should actually be "claim". Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-8, 11-13, and 21-23 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by published European Patent Application EP 1 209 497 A2 to Hirano et al. Hirano et al discloses wavelength converters which are formed from nonlinear optical fibers, and discloses many embodiments of optical fibers which are

suitable for use. In figure 16, optical fiber "F1" has a dispersion slope whose absolute value at 1550 nm is 0.01 (ps/km/nm²), a nonlinear coefficient of 25.2 (1/W/km), and a transmission loss of 0.76 dB/km at 1550 nm. In figure 14 of Hirano et al, optical fiber "E6" has a chromatic dispersion whose absolute value in the general wavelength range specified by applicant is 0.18 (ps/km/nm), a nonlinear coefficient of 21.7 (1/W/km), and a transmission loss of 0.47 dB/km at 1550 nm. The optical fiber wavelength converters of Hirano et al are optically pumped.

Claims 1, 6, 11, 16, and 21 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent 5,960,146 to Okuno et al. Okuno et al discloses wavelength converters (i.e. four wave mixers) which are formed from nonlinear optical fibers, and discloses many embodiments of optical fibers which are suitable for use. In column 11 (EXAMPLE 3), Okuno et al discloses an optical fiber which has a dispersion slope whose absolute value at 1550 nm is 0.01 (ps/km/nm²). In column 19 (EXAMPLE 9), Okuno et al discloses an optical fiber which has a chromatic dispersion whose absolute value in the general wavelength range specified by applicant is 0.2 (ps/km/nm). In column 20 (Sixth Embodiment), Okuno et al discloses an optical fiber having two zero-dispersion wavelengths in the wavelength range of 1530-1570 nm. The optical fiber four wave mixers of Okuno et al are optically pumped.

Claims 5, 10, 15, and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over published European Patent Application EP 1 209 497 A2 to Hirano et al. Hirano et al does not specifically disclose the presence of a blocking filter at the output of the optical wavelength converter for blocking the pumping (input) wavelength

which may have propagated through the optical fiber. Since this is common practice in the optical wavelength conversion art, the presence of such a filter in any of the Hirano et al embodiments would have been obvious to a person of ordinary skill in the art.

Claims 2, 3, 5, 7, 8, 10, 12, 13, 15, 17, 18, 20, 22, 23, and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,960,146 to Okuno et al. Okuno et al does not specifically disclose the presence of a blocking filter at the output of each four wave mixer embodiment for blocking the pumping (input) wavelength which may have propagated through the optical fiber. Such a filter is clearly suggested, however, by figure 42 of Okuno et al, which figure shows several optical filters being positioned at the output of the optical wavelength converting four wave mixer. The presence of a filter for blocking the pumping wavelength in any of the Okuno et al embodiments would thus have been entirely obvious to a person of ordinary skill in the art. Okuno et al also does not specifically disclose that the optical fibers in the embodiments referenced above have a nonlinear coefficient of 10 (1/W/km) or more at 1550 nm, or a transmission loss of 1 dB/km or less at 1550 nm. Since the context presented in the reference with respect to each of the optical fiber embodiments implies that the fibers will have a high optical nonlinearity and a low optical loss, the values for these parameters set forth in applicant's claims would have been obvious in Okuno et al for the person of ordinary skill in the art.

Claim 16 is further rejected under 35 U.S.C. § 103(a) as being unpatentable over Okuno et al (IEEE PHOTONICS TECHNOLOGY LETTERS, January 1998, pages 72-74). In Figure 2, Okuno et al discloses an optical fiber having two zero-dispersion

wavelengths in the wavelength range of 1450-1650 nm. Although the reference does not specifically indicate that this optical fiber is used in an optical wavelength converter, it is mentioned for use in nonlinear optics (see "Index Terms" on page 72). A person of ordinary skill in the art would thus have found this nonlinear optical fiber obvious for use in an optical wavelength converter, since wavelength conversion is an optical nonlinear process.

Claims 4, 9, 14, 19, 24, 25, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The most relevant prior art of record, identified in the rejections set forth above, fails to disclose or reasonably suggest any threshold for the occurrence of Stimulated Brillouin Scattering (SBS) in the optical fibers thereof. The prior art also fails to disclose or reasonably suggest any tuning of the width of wavelengths of the converted light output from the optical fibers thereof.


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patents 5,532,868 (Gnauck et al), 5,619,368 (Swanson), and 6,043,927 (Islam) describe optical fiber-type optical wavelength converters wherein the dispersion and dispersion slope of the optical fibers have specified numerical values. In all these documents, however, the absolute values of dispersion slope are greater than the values required by applicant's claims.

All of the prior art documents submitted by applicant in the Information Disclosure Statement received on December 28, 2004, including the documents relied on in the

rejections above, have been considered and made of record. Note the attached initialed copy of form PTO-1449.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. §§ 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.


John D. Lee
Primary Patent Examiner
Group Art Unit 2874